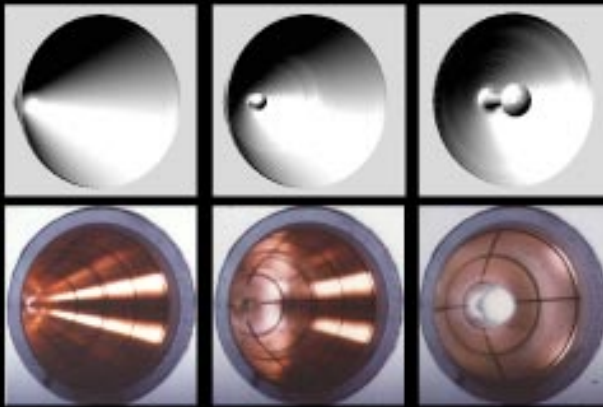


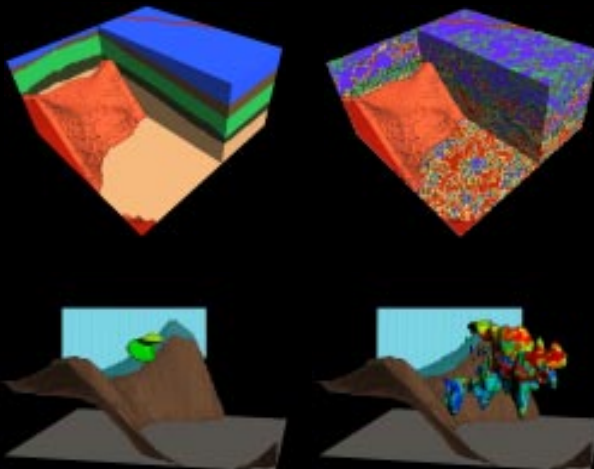
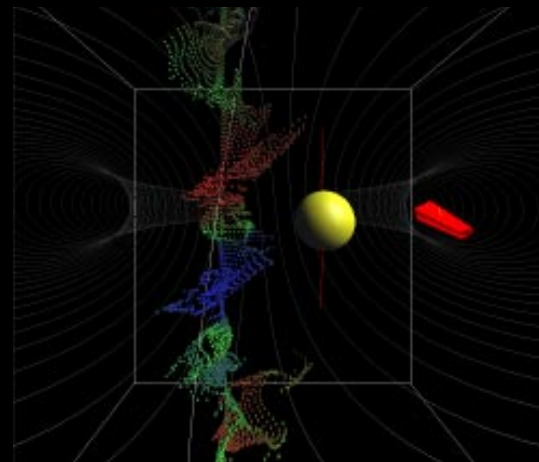
# High Resolution Simulations for DOE Applications

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Comparison of CALE  
simulation of a shaped  
charge with film of an  
actual experiment

Visualization of turbulent  
Gyro-Landau flow within a  
Tokamak reactor



Comparison of ParFlow  
simulations of contaminant  
migration through multilayered  
homogeneous (L) and  
heterogeneous (R) media

# Enabling Accurate CFD Simulations

## DOE today

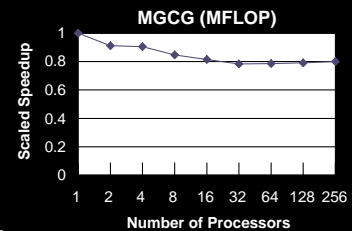
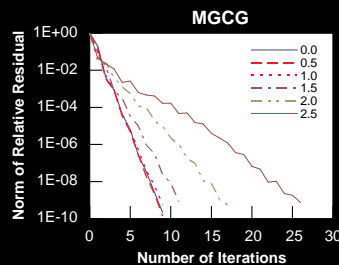
Advanced numerical algorithms are tightly integrated into the application code

## DOE 2000

Portable and reusable HPC software is leveraged across many applications

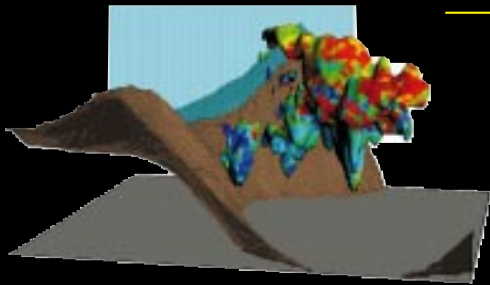
## Efficient elliptic solvers

Multigrid solvers are 100 times faster and more robust than competing methods.



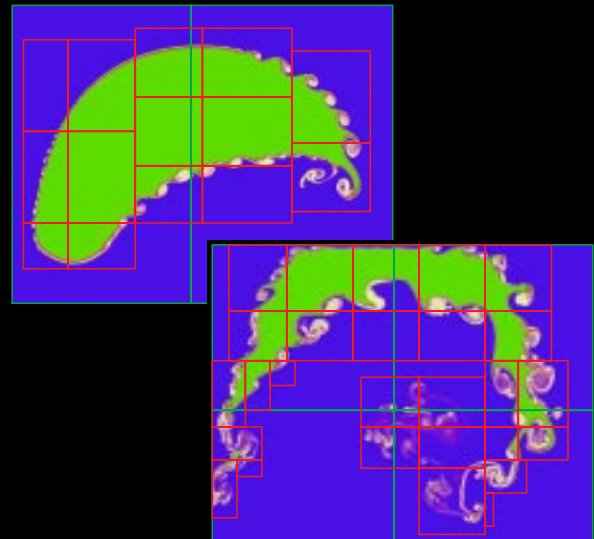
## Accurate advection routines

Higher order explicit Godunov schemes allow one to resolve complicated flow phenomena.



## Adaptive mesh refinement

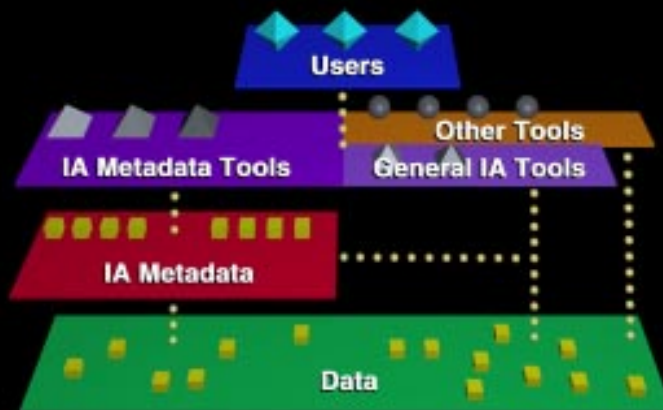
AMR technology can be used to focus computational effort where it is most needed.



# Intelligent Archive Enabling Collaborative Research



Access and organization tools for managing diverse types of data in heterogeneous networks.

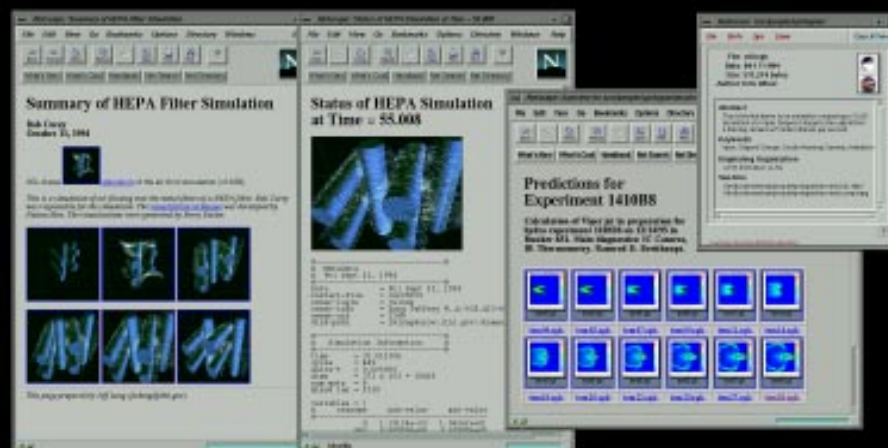


Managing scientific data through the use of metadata

Search, view, organize, and transfer files on the network



Tools for automatic and interactive metadata generation



# HPC Algorithms and Tools for Scientific Applications

*Also see*

- *ImmersaDesk demo at ANL booth*
- *Collaborative demo PPPL/GA/MIT/LLNL at booth 17*